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**NATIONAL AERONAUTICS AND
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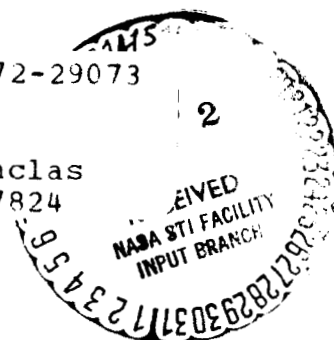
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US-USSR SPACE BIOLOGY REPORT

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NASA and the Academy of Sciences of the USSR have approved recommendations developed at a second meeting of their Joint Working Group on Space Biology and Medicine.

The meeting was held at NASA's Manned Spacecraft Center, Houston, Texas, May 12-18, 1972, following the first meeting held in Moscow in October, 1971.

The Joint Working Group continued its exchange of information, initiated in Moscow, of experiences in manned space flight. The U.S. presentations included the pre- and post-flight medical requirements and flight crew health stabilization program for Apollo 16, a discussion of the preliminary physiological results of that mission, and a glossary of space medicine terminology intended to aid in the mutual understanding of technical and scientific exchanges.

August 1, 1972

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The USSR presentations detailed the medical findings of the Soyuz/Salyut mission, including the postflight autopsy results, the pre- and postflight clinical-physiological examination procedures of cosmonauts, and a special paper dealing with theoretical aspects of predicting crewman physiological response during flight.

The data presented regarding the Soyuz/Salyut flight reveal no indication of deterioration of the physiological status or performance efficiency of the crew during the entire course of the mission prior to the accident. The in-flight data were similar to those of previous Soyuz missions, and generally similar to in-flight Apollo data, and are consistent with both U.S. and USSR findings that a general adaptive process occurs during weightless flight.

The medical information concerning the death of the cosmonauts presented by the Soviets confirms their previous announcement of a loss of pressure in the landing compartment. The death of the cosmonauts was the result of a rapid decompression of the landing capsule which occurred approximately one-half hour before the space ship had returned to Earth. Specifically, the loss of pressure in the landing capsule to zero mm Hg. created conditions incompatible with sustaining human life. Thus, the causes of death of the cosmonauts were the occurrence of hypoxia and gaseous embolism (dysbarism).

A detailed review and evaluation of the data of the Soyuz/Salyut 24 day mission, the longest manned flight to date, reveals no indication of a need to modify current Skylab mission plans from a medical point of view.

An additional and significant development resulting from the meeting was the agreement that the Joint Working Group strive toward the development of common pre- and postflight medical examination procedures for flight crews. Attainment of this objective will permit direct comparison of US and USSR pre- and postflight data on selected body functional areas and thereby increase the information base of both parties regarding man's physiological responses to space flight.

As an initial step, four areas are being considered; namely, orthostatic tolerance (cardiovascular response), vestibular measurements, exercise-working capacity and biochemical examination of body fluids (blood and urine). Details regarding the procedures for these examinations will be exchanged through correspondence and current plans include in-depth discussions of these areas, during the next meeting in Moscow early in 1973.

Soviet Working Group Members were Dr. O. G. Gazenko, Acting Chariman, Dr. L. I. Kakurin and Dr. P. V. Simonov. They were supported by four specialists in biology and medicine. U. S. Working Group Members were Dr. Charles A. Berry, Chairman, Drs. E. J. McLaughlin and Harry Eagle, supported by experts from the Manned Spacecraft Center, Ames Research Center and NASA Headquarters. Dr. Edward Kass, National Academy of Sciences, was an invited participant.

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RECOMMENDATIONS OF THE SECOND MEETING OF THE
JOINT US/USSR WORKING GROUP ON SPACE BIOLOGY AND MEDICINE

Held at the Manned Spacecraft Center
Houston, Texas, May 12-18, 1972

The Joint Working Group on Space Biology and Medicine provided for in the Summary of Results of January 21, 1971, and in accordance with the recommendations developed during its first meeting in October, 1971, in Moscow, held its second meeting at the Manned Spacecraft Center, Houston, Texas, May 12-18, 1972. The list of participants is attached.

1. The Joint Working Group continued its exchange of information of experience in manned space flight programs. It gave special consideration to the following:

- Apollo 16 Preliminary Results
- Soyuz 11/Salyut Results, including data from the autopsy report of the crew of Soyuz 11

2. Both parties consider that the reports on the biomedical results of the recent space flights of Apollo and Soyuz/Salyut contain important theoretical and practical information which is of particular significance with regard to procedures to ensure safe space flight.

3. In addition, the Joint Working Group exchanged information on the following topics of particular interest, with the participation of experts:

- Methods of Pre- and Postflight Medical Observation of Flight Crewmembers
- Need for Exchange of Medical Terminology
- Prediction of In-flight Status of Crewmen
- General Problems of Biological Exploration in Space

4. The Joint Working Group considers it necessary for both parties to strive towards the development of agreed common preflight and postflight medical examination procedures for the flight crews, and criteria for the

evaluation of the data derived through the application of these procedures. The achievement of this objective will require an exchange of proposals, joint consideration of these proposals and the joint development of appropriate common procedures.

It is desirable that the following steps be taken to implement this effort:

a. Exchange of materials covering the schedule, methods and evaluation criteria for pre- and postflight medical examinations of flight crews in the areas of orthostatic tolerance, vestibulometry, exercise-working capacity (ergometry), and chemical constituents of body fluids (blood and urine), within thirty days after confirmation of these recommendations.

b. After review of the materials, the Co-chairmen will reach agreement by correspondence within thirty days after the exchange of these materials on which of the four areas listed above should be scheduled for detailed consideration during the next meeting of the Joint Working Group. If necessary, the Co-chairmen may convene a special Working Session (as provided for in point 2 of the Recommendations of the first meeting of the Joint Working Group, October 13, 1971), with the participation of experts, in conjunction with the next Joint Working Group meeting, to develop detailed recommendations for establishing agreed common procedures in the specific areas selected by the Co-chairmen.

5. The Joint Working Group considers it desirable that the next meeting be held during the first quarter of 1973 in the USSR. At that meeting, in addition to flight data, the following topics should be considered:

- Biological Experiments - Plans for Future Exchange
- Prediction of In-flight Status of Crewmen
- Countermeasures
- Problem of Water-Electrolyte Balance

The Co-chairmen will reach agreement by correspondence on the specific date for the next meeting and on additional topics within the areas already confirmed by the Principals for inclusion in the agenda.

6. The Joint Working Groups suggests that the Principals approve these recommendations, in whole or in part, within 60 days from this date, after which those recommendations which have been approved shall enter into force.

Co-chairmen:


Dr. Charles A. Berry


Prof. Oleg G. Iezzenko, Acting

Date: May 18, 1972

Date: May 18, 1972

**List of Participants in the Second Meeting of the Joint
US/USSR Working Group on Space Biology and Medicine
Manned Spacecraft Center, Houston, Texas**

May 12-18, 1972

U.S. Members

**Charles A. Berry
Co-Chairman**

Harry Eagle

Edward J. McLaughlin

U.S.S.R. Members

**O. G. Gazenko
Acting Co-Chairman**

P. V. Simonov

L. I. Kakurin

Additional Participants

David L. Winter

Edward Kass

Richard S. Johnston

Willard R. Hawkins

Stanley C. White

Philip A. Thibideau

**Various space medicine
specialists from the Manned
Spacecraft Center**

Additional Participants

I. I. Bryanov

Y. M. Svirezhev

I. B. Krasnov

Y. P. Khomenko